A New Species of Cermatulus Dallas from the Three Kings Islands, New Zealand (Heteroptera: Pentatomidae).

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The specimens on which this species is based were collected by Mr. E. G. Turbott, of the Auckland Museum, from *Leptospermum ericoides* shrubland on Great Island, Three Kings (Turbott, 1948, p. 261), and put aside as differing in appearance from *Cermatulus nasalis* (Westwood).

I wish to thank Mr. Turbott for drawing my attention to this interesting material, and Dr. Archey, Director of the Auckland Museum, for the opportunity of examining and describing it.

SUB-FAMILY ASOPINAE.

Genus **CERMATULUS** Dallas.

1851.—Dallas, *List Specimens Hemipt. Ins. Coll. Brit. Mus.* 1, p. 106.
Type: *Aelia nasalis* Westwood, 1837.

Cermatulus turbotti sp. nov. Fig. 1.

Length of the 3 ♀♀ seen: 11.5 mm., 13.5 mm., about 15 mm. (wings spread in this specimen). Total length about twice basal width of pronotum, which is rather less than greatest width across abdomen (5.75 : 6; 6.5 : 7; 7 : 8). Moderately convex above and strongly punctate, punctures finer than in *C. nasalis*, particularly on pronotum; connexivum closely, very finely punctate; finely punctate below, venter of abdomen strongly convex, with punctures sparser and shallower at extreme margins, apex, and particularly in middle. Surface of body rather shining.

Colour: Dark above, with ground-colour of ochreous, punctured and infuscated with black; with more or less distinct bronzy or greenish reflections, either restricted to head or extending also over pronotum and scutellum as a conspicuous metallic sheen. Dorsal surface of abdomen black with bronze or coppery reflections. Ventral surface of abdomen light ochreous; punctures blackish brown; a black patch on either side of mid-line at anterior margin of each sternite, the patches on last complete sternite longer and more irregular than others; anterior and posterior ventral marginal angles of each sternite black.

Head: Nearly flat above, more finely punctate than pronotum. Juga with outer margins straight and parallel in the middle, posteriorly arcuately diverging to meet eyes; anterior angles widely rounded, though less broad than in *nasalis*, with more of the curve lateral and less directly anterior than in this species. Tylus with sides nearly straight and parallel, converging only slightly in front; apical margin free, distinctly convex, in all three specimens projecting slightly beyond juga. Whole snout much less blunt at end than in *nasalis*. Tylus much more sparsely punctate than in *nasalis*, punctures entirely or almost entirely restricted to margins; distinctly transversely rugulose in front and behind. Juga punctate and distinctly rugose.

Tylus black-margined, yellowish ochreous in mid-line. Juga black except for a narrow, sublateral, yellowish ochreous line. A similarly coloured, impunctate, triangular patch behind inner posterior margin of each eye, and another similar but ovoid patch on each side of base of head behind ocellus. On each side, a shining, impunctate, black or bronzy-black patch in front of ocellus, and another behind ocellus internal to the basal ochreous spot.

Greatest width across juga slightly over $\frac{1}{2}$ width across eyes (18: 35; 19: 37; 20: 39). Each eye somewhat less wide than in *nasalis* in proportion to interocular space (only $\frac{1}{3}$:-7: 21; 7.25: 22.5; 8: 23).

Ventral surface pale stramineous; rostrum ochreous, reaching posterior coxae, apical segment black, sides of first segment concave shortly before apex, sparsely and shallowly punctate and obscurely striate.

Antennae: About half as long as body. Antenniferous tubercle small, black above, with a short, pale, ventral spine. First segment very short, black, with ventral ochreous streak; second segment wholly brownish black, or with apex black; the others with base reddish brown and about apical $\frac{2}{3}$ in fifth segment and apical $\frac{1}{2}$ in third and fourth segments black; the dark and paler regions clearly contrasted. Seg. III $\frac{5}{8}$ to $\frac{3}{4}$ as long as II (22: 30; 20: 32; 18: 26); IV in these specimens about $\frac{1}{5}$ longer than III (26: 22; 24: 20; 22:18); V subequal to or rather shorter than IV.

Pronotum: More finely punctate than in *nasalis*. Anterior margin deeply and widely excavated. Anterior angles with a very short, blunt, outwardly and forwardly directed spine. Sides incurved and sinuate at middle, posterior half projecting outwards at a pronounced angle and not in line with anterior half, and posterior angles thus more prominent and acute in appearance than in *nasalis;* anterior half only obscurely crenulate, posterior half smooth. Posterior margin in front of scutellum straight; on each side, outside base of scutellum, with a triangular process overlying base of clavus; postero-lateral margin outside this sinuate. Posterior width 2.15 to 2.25 times length. Lateral margins pale ochreous except on dark posterior shoulders. A more or less pronounced median pale line, most definite anteriorly, and extending on to anterior part of scutellum. Calli black or bronzy black.

Scutellum: Raised and broadly convex in front, remainder nearly flat. Disc distinctly rugulose. Sides concave behind middle, straight before and after concavity, the margins in front of it posteriorly con-

vergent and (with wings closed) incurved at basal angle; margins behind it only slightly convergent; apex broadly rounded, off-white or pale creamy yellow, with only sparse, fine, shallow punctures. Median line with punctures comparatively few and fine; except at base and apex shining black, the black area extending in front to form a Y, with the anterior median pale line enclosed between the arms. Inner margin of fovea at basal angles straight, yellowish ochreous.

Mesosternum: Disc black, with coppery reflections, impunctate, transversely rugulose; median carina a low, ochreous ridge.

Wings: Extending rather further beyond abdomen than in *nasalis*. Corium with an impunctate, shining black patch in centre of posterior two-thirds. Membrane of hemelytra brown, finely rugulose; veins dark. Hind wings nearly colourless, faintly cinereous; veins dark brown.

Legs: Ochreous; femora and tibiae spotted with reddish- or blackish-brown; apex of tibiae and of tarsal segments fuscous, tarsi sometimes almost entirely black. Femora unarmed; with fine, rather long and sparse hairs. A single black, apically directed spine on ventral surface of fore tibiae only; tibiae otherwise unarmed, clothed with fine pubescence; upper surface with shallow, longitudinal groove. Tarsi clothed with fine, pale hairs, longest and erect towards apex of last segment.

Abdomen: Dorsal surface very finely punctate. Sides convex; connexivum extending moderately beyond costal margins of closed wings, posterior angle in each segment projecting slightly beyond anterior margin of the next, but not spined or backwardly produced. Connexivum strongly marked with black at anterior and posterior margins of each segment; orange or orange-brown between them. Anterior abdominal spine very short, not reaching anterior margins of hind coxae.

Localities: Collected by Mr. E. G. Turbott on Great I., Three Kings Is. 1♀, Tasman Valley, 6/5/46; 2 ♀♀ near depot, 5 and 10/5/46; all on *Leptospermum ericoides* A. Rich. (kanuka).

Types: Holotype and 2 paratypes in Auckland Museum.

Close to *Cermatulus nasalis* (Westwood), but readily distinguished by the differently shaped pronotum and juga, the markedly convex apex and nearly impunctate disc of tylus, the finer punctation, particularly on pronotum, the colour of antennae and apex of scutellum, and the metallic bronzy reflections on some or all of the regions listed in the description.

The only other recorded species in the genus, *C. pulcher* Tryon, 1892, is from Fly River, British New Guinea.

For fuller comparison, a redescription of *C. nasalis* is added, giving those features in which this species differs from *C. turbotti*, since most of them are not covered in detail in the earlier descriptions. To avoid recapitulation, features common to both species are omitted from this account.

Cermatulus nasalis (Westwood). Fig. 2.

1837.—*Aelia nasalis* Westwood, *Cat. Hope* 1, p. 32.

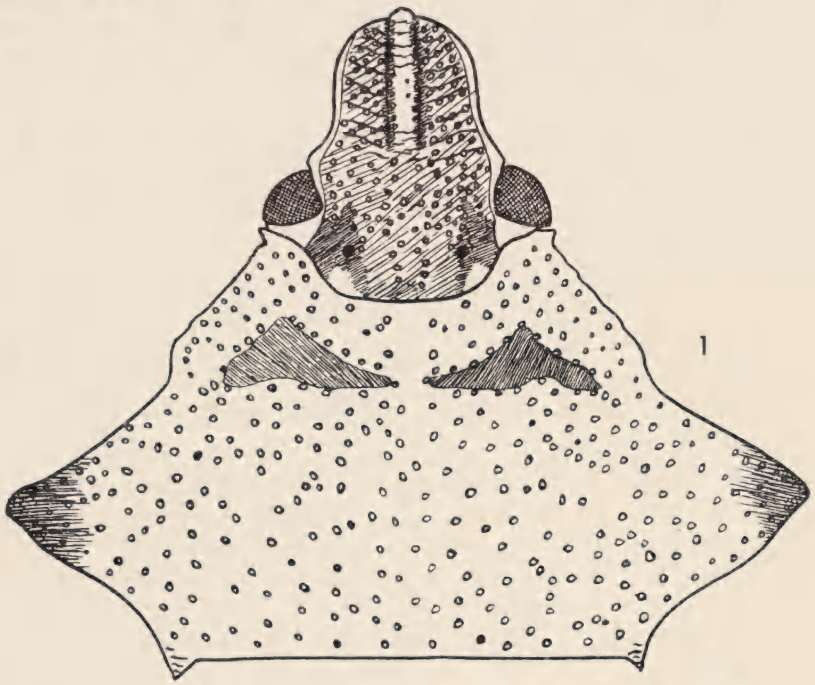
1842.—*Asopus nummularis* Erichson, *Arch. fur Naturg.* 8, p. 276.

1844.—*Asopus nummularis* Herrich-Schaeffer, *Wanzenart. Ins.* 7, p. 114, fig. 776 (as new species).

1851.—*Cermatulus nasalis* (Westwood) Dallas, *List Hem. Ins. Coll. Brit. Mus.* p. 106, pl. 2, fig. 3.

1867.—*Asopus binotatus* Walker, *Cat. Specimens Het. Hem. Coll. Brit. Mus.* 1, p. 144 (recorded from Brazil: in error, according to Kirkaldy, 1909).

1867.—*Rhaphigaster pentatomoides* Walker, *ibid.* 2, p. 370.



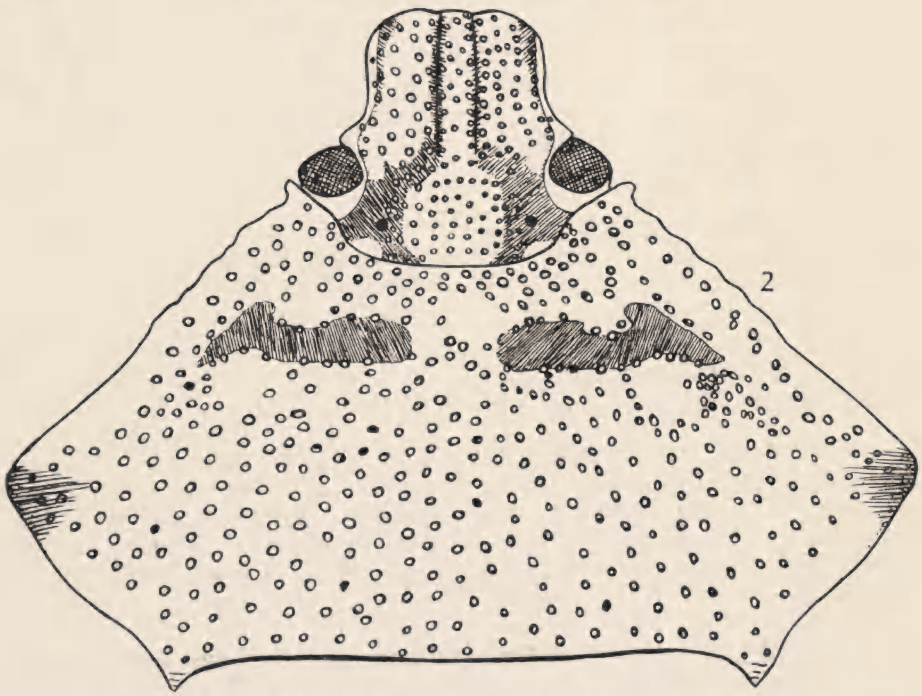


Fig. 1. *Cermatulus turbotti* sp. nov.; head and pronotum.

Fig. 2. *Cermatulus nasalis* (Westwood); head and pronotum.

Length: ♀ ♀, 10.5-12.5 mm. (23 specimens); ♂ ♂, 9-10 mm. (5 specimens). Width across abdomen: ♀ ♀, 5.75-6.75 mm. ♂ ♂, 5-6 mm. Width across pronotal shoulders: ♀ ♀, 5-6 mm.; ♂ ♂, 4.5-5.5 mm. Proportions as in *turbotti*. More coarsely punctate above than in *turbotti*, especially on pronotum. Venter of thorax rather coarsely and deeply punctate, venter of abdomen more finely and shallowly punctate, particularly in middle, at sides and apex.

Colour: Ground-colour of testaceous or ochreous, punctured and infuscated with brownish black. Considerable variation in the general colouration of this species is given by differences in the shade of the ground-colour (yellowish-, orange-, or reddish-brown) and the relative darkness of the punctures and infuscations and the extent of the latter. Without any bronzy metallic sheen. Dorsal surface of abdomen black; ventral surface mottled ochreous and testaceous, rather variable, but darker than in *turbotti*, with similar black markings, but last pair of black patches usually extending to or near posterior end of sternite and broadly confluent behind, sometimes entirely fused.

Head: Anterior angles of juga more broadly rounded than in *turbotti*, with more of the curved margin facing anteriorly. Tylus with free apex straight or very nearly so, at the most scarcely and very broadly and bluntly convex; ending level with juga or very slightly shorter or longer. Whole snout with end more bluntly rounded than in *turbotti*. Each eye somewhat wider than in *turbotti* in proportion to interocular space ($\frac{2}{5}$). Tylus punctate in middle as well as at margins. Tylus and juga with or without rugulae. Vertex with an impunctate black patch narrowly surrounding each ocellus and extending forwards near inner posterior angle of eye. Sides of tylus with narrow black margins, continued back to base of head as broader black bands more or less confluent with the black patches described above. Impunctate, ochreous spots as in *turbotti*. Rostrum ochreous or reddish brown, apical segment brownish black or black, sides of first segment rarely distinctly concave before apex.

Antennae: First segment ochreous, sometimes more or less infuscated; other segments ochreous or reddish brown, second wholly so, third and fourth with about apical $\frac{1}{2}$ and fifth with about apical $\frac{2}{3}$ fuscous or dark reddish brown, the dark apices less heavily pigmented and less strongly contrasted with the paler bases than in *turbotti*, the two regions often scarcely differentiated. Seg. IV $\frac{1}{3}$ to $\frac{1}{2}$ as long again as III. Other proportions with range as in *turbotti*.

Pronotum: Very coarsely punctate. Sides straight or nearly straight, sometimes slightly sinuate at middle; anterior half more or less distinctly crenulate, posterior half smooth. Posterior shoulders less prominent and more bluntly rounded than in *turbotti*. Posterior width 2.3 to 2.45 times length. Lateral margins paler ochreous throughout. Calli black.

(Fig. 2 illustrates about the maximum extent of the lateral sinuation, to show that even where such occurs the condition is markedly distinct from that in *turbotti*. Many specimens of *nasalis* have the margins quite straight.)

Scutellum: Disc not distinctly rugulose. Apex yellowish- or orange-brown. Mid-line, except at base and apex, black or brownish black. Inner margin of fovea at basal angles ochreous or orange-brown.

Mesosternum: Black; median low ridge usually pale.

Wings: Shortly exceeding abdomen. Hind wings cinereous, with green reflections; veins dark brown.

C. nasalis is a rather variable species (size, colour, proportionate length of antennal segments, presence or absence of a slight sinuation in sides of pronotum). In respect of the first three features, *C. turbotti* also shows variation; the length, indeed, in the three ♀ ♀ examined has a greater range than in 23 ♀ ♀ of *nasalis* collected at different times from several widely separated localities. There seems little doubt that the distinctive specific characters of *turbotti* have evolved as the result of the continued isolation of a restricted population, initially sharing the general variability in certain features and possibly at the same time displaying small local peculiarities, later accentuated and added to.

The apparently local origin and restricted insular distribution of this species is of interest in view of the very wide distribution of *C. nasalis*, which occurs in Australia and Tasmania and, within New Zealand, has been recorded from a wide range of localities in both North and South Islands. (See, e.g., Myers, 1926, p. 494.)

Factors involved in the isolation of the Three Kings fauna include the continued separation of the islands from the mainland, now about 35 miles away, since about the early Tertiary, the effects of wind and strong currents, and the sheer, rocky shores. (See, e.g., Buddle, 1948; Oliver, 1948; Turbott and Buddle, 1948.)

The isolation of such a small population could easily have provided suitable conditions (e.g., by periodic or even a single extreme reduction in the numbers of the effective breeding population in the area) to permit action of the Sewall Wright effect, which increases rapidly with the smallness of the population, in the differentiation by "drift" of a new species in the Three Kings, while on the mainland the population has remained conspecific with the Australian form.

While there is as yet little or no direct information on the present numbers or biology of the species, it is possible to list tentatively a number of factors which might have induced such a process as outlined above: (1) The initial segregation and continued isolation of a population extremely small in comparison with that of the mainland. (2) The observed low population density of species of the predacious sub-family Asopinae, compared with that of many phytophagous insects, including other Pentatomidae. (3) The long non-breeding period of *C. nasalis* (as of most other Pentatomids) compared with the breeding period. (Univoltine, with the breeding season restricted to a few weeks in the warmer part of the year.) There is thus ample opportunity for the considerable reduction of the breeding population for any one year (especially in view of the smallness of the area inhabited, which increases the chances of factors acting more or less uniformly throughout it). Two main factors which might be involved, either singly or together,

in such reduction: exceptionally adverse climatic or other ecological conditions during the long non-breeding period (particularly over winter); an extreme fluctation in (egg) parasite-host balance, involving a temporary decrease in numbers of the latter, followed by a rapid building up of the population from the survivors. (4) Judging from collections, the apparently small proportion of males to females in *C. nasalis*, materially reducing the effective size of the population. (Wright, 1940, p. 170.)

The Asopinae are predacious. Thus any possible effects, on the biology of the species, of the recent vegetational changes that have occurred on Great Island through the depredation of goats (Baylis, 1948; Turbott, 1948), would presumably have been mainly or entirely indirect, through their influence on the populations of insect prey. But since the known range of prey of other species of the sub-family, including *C. nasalis*, is very wide, such effects have probably been negligible or at least much less extensive than with many of the purely phytophagous insects, and the population has probably not suffered adversely. It is possible that the development of a *Leptospermum* shrubland, typically with the insect and other arthropod fauna prolific in numbers of individuals, has even increased the population. In any case, as is general in this predacious group, specimens, even if fairly numerous over an area, would be expected to be rather sparsely distributed within it.

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